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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/404,122	09/23/1999	AMOS YAHIL	7684-PA01	8061

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EXAMINER

SHARON, AYAL I

ART UNIT PAPER NUMBER

2123

DATE MAILED: 05/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

09/404,122

Applicant(s)

YAHIL ET AL.

Examiner

Ayal I. Sharon

Art Unit

2123

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 1999 and 16 July 2001 .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/23/99 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☒ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachments

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,9 .
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____ .

DETAILED ACTION

Introduction

1. Claims 2-13 of U.S. Application 09/404,122 filed on 09/23/1999 are presented for examination. Applicant has cancelled Claim 1.

Preamble of the Claims

2. The preambles of Claims 2 and 8, as presented for examination, have not been given patentable weight. Appropriate weight is given to limitations recited in the body of the claim that are needed for purpose of antecedence. "A mere statement of purpose or intended use in the preamble of a claim need not be considered in finding anticipation; however, it must be considered if the language of a preamble is necessary to give meaning to the claim" *Diversitech Corp. v. Century Steps, Inc.*, 7 USPQ2d 1315 (Fed. Cir. 1988); *In re Stencel*, 4 USPQ2d 1071 (Fed. Cir. 1987)

Information Disclosure Statement

3. The Applicants are reminded of their declaration acknowledging the duty to disclose to the Office all information known to them to be material to patentability as defined in 37 CFR 1.56.

4. During the process of examination, Examiner has been made aware of the existence of the following related prior art, authored by one of the applicants:
"Information, Language, and Pixon-Based Image Reconstruction" by R.C. Puetter. One version of which (1995) is published in Non-Linear Signal and Image Analysis, Proceedings of the 11th Florida Workshop on Non-Linear Astronomy and Physics, University of Florida. A later version (1996) is published in Proceedings of SPIE.
5. Moreover, there is the article "Pixon-Based Multiresolution Image Reconstruction and the Quantification of Picture Information Content", Int'l. Journal of Image Systems & Technologies pp.314-331, Winter 1995. And there is also an article "The Pixon Method of Image Reconstuction", Proc. ADASS '98 which specifically refers to the Winter 1995 Int'l. Journal of Image Systems & Technologies article.
6. Moreover, on the home page of Rick Puetter (Last updated Feb. 21, 2000. See p.3), it is written that "The Pixon method is a high performance image reconstruction method developed by R. Pina and R. Puetter at USCD in 1992/1993 and accelerated in computational speed by Yahil and Puetter in 1996/1997".
7. Applicants are requested to provide documentation pertaining to the work performed by Yahil and Puetter in 1996/1997, as well as all other information known to be material to patentability.

Oath/Declaration

8. On the home page of Rick Puetter (Last updated Feb. 21, 2000. See p.3), it is written that "The Pixon method is a high performance image reconstruction method developed by R. Pina and R. Puetter at USCD in 1992/1993 and accelerated in computational speed by Yahil and Puetter in 1996/1997".

Clarification as to Mr. Pina's relationship to the claimed invention is requested.

Government License Rights to Contractor-Owned Inventions Made Under Federally Sponsored Research and Development

9. Where a Government contractor retains U.S. domestic patent rights, the contractor is required to include the following statement at the beginning of the application and any patents issued thereon:

"The U.S. Government has a paid-up license in this invention and the right in limited circumstances to require the patent owner to license others on reasonable terms as provided for by the terms of (contract No. or Grant No.) awarded by (Agency)."

If reference is made in the first sentence of the application to prior co-pending applications of the applicant, such prior applications must be referred to in the first sentence of the specification (37 CFR 1.78(a) and MPEP § 201.11), and in this case the required "Government License Rights" statement should follow immediately as the second paragraph of the specification. If there is no reference to an earlier application, the required "Government License Rights" statement should appear as the first paragraph of the specification. See 37 CFR § 1.77.

10. Examiner acknowledges the incorporated by reference to the instant application of U.S. Patents No. 5,912,993 and 6,353,688, both of which are assigned to the Regents of the University of California, and both of which have the above specified paragraph regarding U.S. Government patent rights.
11. During the process of examination, Examiner has been made aware of the existence of the following related prior art, authored by one of the applicants:
"Information, Language, and Pixon-Based Image Reconstruction" by R.C. Puetter. One version of which (1995) is published in Non-Linear Signal and Image Analysis, Proceedings of the 11th Florida Workshop on Non-Linear Astronomy and Physics, University of Florida. A later version (1996) is published in Proceedings of SPIE.
12. Moreover, there is the article "Pixon-Based Multiresolution Image Reconstruction and the Quantification of Picture Information Content", Int'l. Journal of Image Systems & Technologies pp.314-331, Winter 1995. And there is also an article "The Pixon Method of Image Reconstuction", Proc. ADASS '98 which specifically refers to the Winter 1995 Int'l. Journal of Image Systems & Technologies article.
13. The above mentioned articles specifically state that the work was supported in part by NASA grants NAG-53944, AR-07551.01-96A, as well as "grants from the NSF, the California Association for Research in Astronomy, and Cal Space". The aforementioned patents, which have been incorporated by reference, state that the U.S. government has rights to those patents pursuant to NSF grants AST-

8819116 and AST-8922006, NASA grant NAG-51228, and U.S. Dept. of Energy grant DE-FG02-87ER40317. No mention of these or any other grants is made in the instant application. Clarification of this discrepancy is requested.

Drawings

14. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed. Examiner objects to Fig. 1a and Fig. 1b in accordance with 37 CFR 1.84(i). Lines are not uniformly thick and well defined.

Specification

15. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: "System and Method for Prediction of Behavior of Financial Systems".
16. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

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The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:
(1) if a machine or apparatus, its organization and operation;
(2) if a process, the steps.

17. The abstract of the disclosure is objected to because the abstract does not provide a concise statement of "that which is new in the art to which the invention pertains". Moreover, the abstract includes speculative applications of the invention. Correction is required. See MPEP § 608.01(b).

Claim Interpretations

18. Examiner interprets "daily returns of financial securities" as being the prices of stocks, bonds, and other financial instruments at the end of trading on days in which the financial markets are open for business.

Claim Rejections - 35 USC § 112

19. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

20. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

21. Claims 2, 5-8, and 11-13 are rejected under 35 U.S.C. 112, first paragraph.

Specifically, since the claimed invention is not supported by either a specific and

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substantial asserted utility or a well established utility for the reasons set forth in the 35 USC § 101 rejections below, one skilled in the art clearly would not know how to use the claimed invention.

22. Claims 2-13 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims 2 and 8, for example, refer to “measured data points”, however no means for “measuring” data points or obtaining “measured data points” is enabled in the specification. There also is no enablement of how the invention will differentiate between “measured” and non-“measured” data points. All dependent claims inherit this defect.

23. Claims 2-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims 2 and 8, for example, refer to a “predetermined minimum level”, however, this “predetermined minimum level” is not specified. All dependent claims inherit this defect.

Claim Rejections - 35 USC § 101

24. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

An invention which is eligible for patenting under 35 U.S.C. § 101 is in the “useful arts” when it is a machine, manufacture, process or composition of matter, which produces a concrete, tangible, and useful result. The fundamental test for patent

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eligibility is thus to determine whether the claimed invention produces a "useful, concrete and tangible result." The test for practical application as applied by the examiner involves the determination of the following factors:

(1) "Useful" - The Supreme Court in *Diamond v. Diehr* requires that the examiner look at the claimed invention as a whole and compare any asserted utility with the claimed invention to determine whether the asserted utility is accomplished. Applying utility case law the examiner will note that:

- (a) the utility need not be expressly recited in the claims, rather it may be inferred.
- (b) if the utility is not asserted in the written description, then it must be well established.

(2) "Tangible" - Applying *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994), the examiner will determine whether there is simply a mathematical construct claimed, such as a disembodied data structure and method of making it. If so, the claim involves no more than a manipulation of an abstract idea and therefore, is nonstatutory under 35 U.S.C. § 101. In *Warmerdam* the abstract idea of a data structure became capable of producing a useful result when it was fixed in a tangible medium which enabled its functionality to be realized.

(3) "Concrete" - Another consideration is whether the invention produces a "concrete" result. Usually, this question arises when a result cannot be assured. An appropriate rejection under 35 U.S.C. § 101 should be accompanied by a lack of enablement rejection, because the invention cannot operate as intended without undue experimentation.

25. Claims 2, 5-8, and 11-13 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

26. Claims 4,5,10,11 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility. It is not clear what is the utility of these equations.

27. Claims 2, 5-8, and 11-13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims are not tangible because they recite abstract ideas and/or mathematical constructs.

Claim Rejections - 35 USC § 103

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

29. The prior art used for these rejections is as follows:

30. Puetter, R.C. "Pixon-Based Multiresolution Image Reconstruction and the Quantification of Picture Information Content", Int'l. Journal of Image Systems & Technologies pp.314-331, Winter 1995. (Item #2 on Pixon web site bibliography, June 21, 2001. Henceforth referred to as "**Puetter Publication 2**")
31. Puetter, R.C. "The Pixon Method of Image Reconstuction", Proc. ADASS '98 (Nov. 1-4, 1998). In Astronomical Data Analysis Software and Systems VIII, Vol. 172, pp.307-316. (Item #17 on Pixon web site bibliography, June 21, 2001. Henceforth referred to as "**Puetter Publication 17**")
32. Mathworks, Inc. "MATLAB Functional Reference: 'sum' function" Copyright 1994-2001. Also, Sepherke, Matlab "Matrix and Element-wise Operations", March 21, 1998. <http://www.mit.edu/afs/sipb/project/www/matlab/imatlab/node10.html>. Provides a 1998 date for the MATLAB 'sum' function. (Henceforth referred to respectively as "**Matlab Functional Reference**" and "**Matlab Matrix Operations**")
33. Mathworks, Inc. "The MATLAB Computing Environment for Finance and Economics" internet web site, Copyright 1997.
<http://www.ccr.jussieu.fr/ccr/Documentation/Calcul/matlab5v11/docs/>

(Henceforth referred to as "**Matlab for Finance**")

34. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

35. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17.

36. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17 and further in view of Matlab for Finance.

37. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17 and further in view of Matlab Function Reference and Matlab Matrix Operations.

38. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17.

39. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17 and further in view of Official Notice.

40. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Puetter Publication 2 in view of Puetter Publication 17 and further in view of Official Notice.

41. Claims 8-13 are rejected based on the same reasoning as claims 1-7, supra. Claims 8-13 are apparatus claims reciting the equivalent limitations as are recited in method claims 2-7 and taught throughout Puetter Publication 2,

**Puetter Publication 17, Matlab for Finance, Matlab Function Reference,
Matlab Matrix Operations and Official Notice.**

42. In regards to Claim 2, Puetter Publication 2 teaches the following limitations of claim 2:

(b) defining a first subset of independent variables within the set of independent variables comprising a least quantity of independent variables estimated to fit the measured data;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(c) determining a goodness-of-fit to the measured data at a predetermined minimum level for each independent variable of the first subset of independent variables;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(d) eliminating each independent variable within the first subset whose presence or elimination fails to change the goodness-of-fit at the predetermined minimum level;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(e) defining a next subset of independent variables larger than the first subset of independent variables;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(f) adding the next subset of independent variables to a remaining group of the first subset of independent variables to define a combined group of independent variables;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(g) determining the goodness-of-fit to the measured data at the predetermined minimum for the combined group of independent variables;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(h) eliminating each independent variable of the combined group of independent variables whose presence or elimination fails to change the goodness-of-fit at the predetermined minimum level;

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(i) repeating steps (e) through (h) until the goodness-of-fit to the measured data meets the predetermined minimum level in a final iteration; and

(Puetter Publication 2: especially section 4.12, pp.12-13.)

(j) providing an output comprising the combined group of independent variables remaining after the final iteration, wherein the remaining independent variables comprise the smallest subset of independent variables that fits the measured data.

(Puetter Publication 2: especially section 4.12, pp.12-13.)

However Puetter Publication 2 does not expressly teach that the method is computer based, as in the following claims:

2. A computer-based method for prediction of behavior in a complex system using measured data comprising a plurality of data points and a set of independent variables, the method comprising the steps of:

(a) inputting the plurality of data points and the set of independent variables into a computer;

Puetter Publication 17 teaches that the "original Pixon method is freely available in IDL and C++", both of which are computer programming languages. Puetter Publication 17 also teaches (see p.5) that the "original Pixon method" is the one taught in Puetter Publication 2.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Puetter Publication 2 and Puetter Publication 17 by running this method on computer, because this would result in a savings of time. Moreover, Examiner would like to remind Applicant that automation of a manual process is, by itself, not grounds for patentability.

43. In regards to claim 3, claim 2 is rejected as described above. Puetter Publication 2 teaches the following limitations of claim 3:

3. The computer-based method of claim 2, wherein the plurality of data points comprises daily returns of financial securities, wherein the daily returns have unknown covariances.

Puetter Publication 2 does not expressly teach the use of financial data in a method originally designed for image processing. However, it must be noted that Puetter Publication 2 specifically teaches that "pixon-based methods have consequences and implications for fields outside of image restoration/reconstruction, including data compression and information theory Multiresolution techniques are receiving considerable attention in many fields of endeavor. Such fields include ...neural networks, astrophysics, and motion detection to mention just a few recent examples." (p.1)

Matlab for Finance does expressly teach the use of data interpolation, curve fitting and smoothing (see "Spline Toolbox"), neural networks (see "Neural Network Toolbox"), time series analysis. Moreover, Matlab also has image processing capabilities (see "Image Processing Toolbox").

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Puetter Publication 2 and Matlab for Finance by using the product for both image processing and financial data, because Puetter Publication 2 (p.1, right column) specifically says that the method has many possible applications.

44. In regards to claim 4, claims 2-3 are rejected as described above. Puetter

Publication 2 teaches the following limitations of claim 4:

4. The computer-based method of claim 3, wherein the daily returns comprise a linear combination of unknown factors and a part that fluctuates independently corresponding to noise, according to the relationship

$$X_{\alpha} = \sum_{\beta=1}^k \Lambda_{\alpha,\beta} f_{\beta} + N_{\alpha}$$

where α and β are financial securities, α is the daily return for financial security α , f_{β} is an unknown factor, $\Lambda_{\alpha,\beta}$ is a loading matrix, and N_{α} is the noise.

Puetter Publication 2 does not expressly teach this particular formula, which is the summation of the values of the rows or columns of a 2-dimensional array, thus forming a 1-dimensional array

Matlab Functional Reference ("sum", pp.1-2) does expressly teach the summation of the values of the rows or columns of a 2-dimensional array, thus forming a 1-dimensional array.

Matlab Matrix Operations expressly teaches that the "sum" command existed in the 1998 version of Matlab.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Puetter Publication 2 and Matlab Function Reference and Matlab Matrix Operations because this operation is a very basic and fundamental one in the field of linear algebra and widely used in many algorithms.

45. In regards to claim 5, claim 2 is rejected as described above. Puetter Publication

2 teaches the following limitations of claim 5:

5. The computer-based method of claim 2, wherein the goodness-of-fit is the logarithm of the likelihood function according to the relationship

$$L = -2 \ln \Pr(D|M) = \sum_n w_n (\ln ||V_n|| + x_n \cdot V_n^{-1} \cdot x_n)$$

where L is the log-likelihood function, V is the covariance matrix, $\Pr(D|M)$ is a goodness-of-fit quantity measuring the probability of data D given model M, and W_n is an arbitrary weight.

This equation is what is commonly known in the art as the Bayesian Information Criterion (BIC) or the Schwartz Bayesian Criterion (SBC).

Puetter Publication 2 (p.4, Eq.6) expressly teaches a mathematical equivalent of the two left components of the equation.

However, Puetter Publication 2 does not expressly teach the right side of the equation.

Puetter Publication 17 (p.4, Eq.4) expressly teaches a mathematical equivalent of the right side of the equation. Moreover, Puetter Publication 17 expressly cites Gull 1989 and Skilling 1989 as references for this equation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Puetter Publication 2 and Puetter Publication 17, because the linear algebra implementation of this equation is needed for use in a computer system.

46. In regards to claim 6, claim 2 is rejected as described above. Puetter Publication

2 teaches the following limitations of claim 6:

6. The computer-based method of claim 2, wherein the least quantity of independent variables corresponds to zero unknown factors and a covariance matrix consisting of a diagonal.

Puetter Publication 2 does not expressly teach either a least quantity of independent variables corresponds to zero unknown factors, nor a covariance matrix consisting of a diagonal.

Official Notice is given that it is well known that a system with “zero unknown factors” is one in which all factors are known, and it is well known to be impossible for a system to have less than zero unknown factors.

Moreover, Official notice is given that it is well known that a diagonal covariance matrix represents a system of independent variables.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the the teachings of Puetter Publication 2 and Official Notice, because a modeled system in which all variables are known, and all variables are independent, is an extreme case which is easily solved and verified.

47. In regards to claim 7, claim 2 is rejected as described above. Puetter Publication

2 teaches the following limitations of claim 7:

7. The computer-based method of claim 2, wherein the output comprises a covariance matrix containing a plurality of loading matrix coefficients, wherein the number of off-diagonal, non-zero loading matrix coefficients is minimized.

Puetter Publication 2 does not expressly teach either a least quantity of independent variables corresponds to zero unknown factors, nor a covariance matrix consisting of a diagonal.

Official Notice is given that it is well known that a system with “zero unknown factors” is one in which all factors are known, and it is well known to be impossible for a system to have less than zero unknown factors.

Moreover, Official notice is given that it is well known that a diagonal covariance matrix represents a system of independent variables.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the the teachings of Puetter Publication 2 and Official Notice, because a modeled system with zero unknown factors and independent variables is an extreme case which is easily solved, and is a simple way to test the solving method.

Conclusion

48. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.
49. Verdinelli, Isabella et al. "Bayesian Goodness of Fit Testing Using Infinite Dimensional Exponential Families", Carnegie Mellon Dept. of Statistics Technical Reports, Report #640, January 1996. <http://www.stat.cmu.edu/tr/tr640/tr640.html>
Shows the development of a nonparametric Bayes factor for testing the fit of a parametric model.
50. Murphy, Kevin. "A Brief Introduction to Graphical Models and Bayesian Networks". <http://http.cs.berkeley.edu/~murphyk/Bayes/bayes.html>
Last updated Oct. 3, 2001. The section on "Unknown structure, partial observability" (pp.18-19) defines the BIC, and cites Friedman 1997 as reference.
51. Schlögl, Alois. "Index for /home/schloegl/matlab/tsa", "Content", and "Selmo" from "Alois' Matlab and Math's Site", Time Series Analysis pages. Aug. 17, 1997. <http://www-dpmi.tu-graz.ac.at/~schloegl/matlab/tsa/1.tsa/index.html>
Clearly shows that BIC and SBC were available for use in Matlab back in 1997, and specifically cites Wei 1994, Schwartz 1978 and Akaike 1978, 1979.
52. Mathworks, Inc. "GARCH Toolbox: For Use with Matlab" Copyright 1999-2000. pp.2-5, 2-6. Provides formula for AIC and BIC. Cites as reference Box et al., from 1994.
53. SAS, Inc. "The VARMAX Procedure: Overview". Copyright 2000. Specifically states that "Schwartz Bayesian Criterion (SBC) is also known as Bayesian

Information Criterion (BIC)".

<http://www.sas.com/rnd/app/da/new/801ce/ets/chap4/sect1.htm>

54. USGS Northern Prairie Wildlife Research Center, "Suggestions for Presenting the Results of Data Analyses: Information-Theoretic Methods", 2001. Specifically refers to Bayesian Information Criterion (BIC) and cites Schwartz 1978.
55. Forster, M.R. "The New Science of Simplicity". (1999). Refers to "Bayesian BIC criterion" and specifically cites Schwarz 1978.
56. Pixon™ homepage and bibliography, June 21, 2001
57. Peutter et al., U.S. Patent No. 5,912,993. (Henceforth referred to as "Peutter Patent 1")
58. Peutter et al., U.S. Patent No. 6,353,688. (Henceforth referred to as "Peutter Patent 2")
59. Puetter, R.C. "Language and Information Content". Proc. Of 1995 IAC Winter School, Dec. 3-12, 1995, Tenerife, Spain. (Item #6 on Pixon web site bibliography, June 21, 2001.)
60. Puetter, R.C. "Information, Language, and Pixon-Based Image Reconstruction". Non-Linear Signal and Image Analysis, Proceedings of the 11th Florida Workshop on Non-Linear Astronomy and Physics, Nov. 30 – Dec. 2, 1995. (Item #10 on Pixon web site bibliography, June 21, 2001.)
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Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (703) 306-0297. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on (703) 305-9704. Any response to this office action should be mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Hand-delivered responses should be brought to the following office:

4th floor receptionist's office
Crystal Park 2
2121 Crystal Drive
Arlington, VA

The fax phone numbers for the organization where this application or proceeding is assigned are:

Official communications:	(703) 746-7239
Non-Official / Draft communications	(703) 746-7240
After Final communications	(703) 746-7238

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is:
(703) 305-3900.

Ayal I. Sharon

Art Unit 2123

May 15, 2002

A handwritten signature in black ink, appearing to read 'W. Thomson', with a stylized, cursive script.

William Thomson

Art Unit 2123

May 15, 2002